

REMARKS

This amendment is submitted after final rejection under 37 CFR 1.116 because Applicants believe that all claims now presented are in condition for allowance. In any event entry of this response will place the application in better form for appeal. Applicants have raised no new issues and have included no new matter. Finally the points made by the Applicants herein are in direct response to points raised by the Examiner in the last office action and Applicants could not have filed their response at an earlier date.

In view of the fact that the office action of 24 June 2008 contains a final rejection of all claims, and since the Applicants' six month statutory period for response expires on 24 December 2008, Applicants have responded to the office action by filing a Response After Final Rejection Under 37 CFR 1.116, together with a Notice of Appeal filed concurrently therewith.

The undersigned held a telephone interview with Examiner Mc Donough and Supervisory Examiner Lorengo on 5 June 2008 in which the Examiners and the undersigned discussed REYNOLDS and GROSSE et al references, and the Examiner's rejection of the claims as obvious in view of the combination of those references. From reading the Examiner's Interview Summary Record mailed 11 June 2008, Applicants had the impression that the Examiners agreed that the presently claimed invention patentably distinguished over the combination of REYNOLDS and GROSSE et al, with or without the three

cited secondary references. However, Applicants learned from the office action mailed 24 June 2008 that the Examiner had changed his mind and now determined that the combination of REYNOLDS, GROSSE et al, and STICKLER renders most of the claims now presented as obvious under 35 USC 103. The only claims that the Examiner did not reject in view of this combination of three references are claims 18, 32 and 14. The Examiner has rejected Claims 18 and 32 as obvious in view of the three primary references together with KRIVOHRAVEK and has rejected claim 42 as obvious in view of the three primary references together with KEILBACH et al. All rejections are FINAL as confirmed in a telephone call between Examiner Mc Donough and the undersigned on 22 December 2008.

Applicants believe that the Examiner's interpretation of the STICKLER reference, and its combination with REYNOLDS and GROSSE et al significantly differs from that of the Applicants. The Examiner believes that the STICKLER reference discloses a continuous, solid phase fuel matrix made of the same organic polymers that comprise the Applicants' open pore plastic foam fuel. The Examiner refers specifically to col. 4, lines 50 to 60 of STICKLER. The Examiner equates the STICKLER continuous solid phase fuel matrix with the aluminum sponge with interconnecting pores disclosed in REYNOLDS, and argues that one skilled in the art would substitute the STICKLER plastic matrix for the aluminum foam of REYNOLDS to arrive at the presently claimed invention after taking

the teachings of GROSSE et al into account where both the fuel and the oxidizer are both frozen. The Examiner goes on to list what he regards as obvious advantages to using a plastic foam fuel over the aluminum foam fuel of REYNOLDS, including the fact that plastic is lighter than metal, plastic polymers of high molecular weight would introduce more entropy into the system, and the increased molecular randomness would be of benefit in a rocket fuel, and in the art of energetic materials, it is well known that both metals and organic polymers (plastics) may serve as fuels.

Applicants do not agree that the STICKLER continuous solid phase fuel is the equivalent of the REYNOLDS aluminum sponge open pore foam and do not agree that the STICKLER continuous solid phase fuel is the same as Applicants' open pore plastic foam fuel. Applicants have looked at Fig. 3 of STICKLER and do not agree that element 30 is the same as Applicant's open pore plastic foam fuel and do not agree that element 30 in STICKLER shows an open pore foam at all. In addition the polymeric fuel disclosed in STICKLER contains two parts: one part is element 30 which is the continuous solid phase fuel and the other part is element 32 which is dispersed in element 30. STICKLER describes element 32 as a dispersed particulate phase permanently distributed in the continuous solid phase fuel. No such particulate fuel phase comprises a part of the Applicant's fuel. Therefore the STICKLER polymeric fuel is not the equivalent of either Applicant's open

pore plastic foam fuel or the REYNOLDS aluminum sponge open pore foam fuel.

The STICKLER polymeric fuel features a continuous phase and a particulate phase dispersed within the continuous phase that includes up to 20% oxygen in the dispersed phase. See col. 5 at the bottom and claim 33. Thus STICKLER does disclose an organic polymer matrix that contains an oxidizer. Furthermore, the reference makes no mention of cryogenic temperatures and no mention of adding the oxidizing agent to the open pore plastic foam fuel and then freezing the oxidizing agent in the pores of the foam fuel to obtain the presently claimed composition. Thus both steps (a) and (b) of process claim 17 are novel and unobvious and neither step is disclosed nor suggested in the combination of REYNOLDS, GROSSE et al and STICKLER.

REYNOLDS includes no disclosure of an open pore plastic foam fuel and no disclosure of freezing an oxidizing agent within the pores of the foam fuel REYNOLDS discloses an open pore aluminum sponge as the fuel which contains a liquid oxidizer, not a solid. GROSSE et al discloses adjacent layers of solid fuel and solid oxidizer. See for instance elements 12 and 13 in Fig. 1. STICKLER has no disclosure of cryogenic treatment at all for either the polymeric fuel or the oxidizer. Thus steps (a) and (b) of process claim 17 provide an additional argument for patentability over

these three references in combination, over and above the fact that the cryogenic solid monergole propellant prepared according to claim 17 and the claims dependent thereon and covered by composition claim 31 and the claims dependent thereon, differs from the compositions disclosed in all three references, and that the combination of all three of these references would not lead one "skilled in the art" to the presently claimed invention.

In their previous responses Applicants have argued that the REYNOLDS compositions are explosive and that the GROSSE et al compositions are at least self-igniting, if not explosive, and that neither reference discloses a monergole. In the case of STICKLER, the reference discloses at the bottom of col. 2, that the hybrid rocket fuel according to the invention is easily prepared, cast and stored without inherent explosion hazard. However, that still does not mean that STICKLER discloses a monergole.

In the case of claims 18 and 32, Applicants have a good argument that the independent claims are patentably distinguishable over the three primary references, and that they should not have to be concerned about the Examiner's application of KRIVOHlavek. In the case of claim 42, Applicants maintain that the combination of the three primary references with KEILBACH et al does not render any of these claims obvious, since the metallic solid phase structure disclosed in the reference, namely, Be, has nothing in

common with the organic polymers according to the present invention. In other words the need to protect the Be from reacting with the oxidizing agent has little to do with a need to protect the polymers of the present invention from oxidation as well. Thus claim 42 especially patentably distinguishes over the cited combination of prior art references.

Applicants now have the following direct comments in response to the Examiner's arguments set forth on pages 6 to 10 of the office action.

REYNOLDS relates to a combustion system comprised of a solid metallic sponge of a combustible metal such as aluminum and magnesium, with the sponge having in its interior a great number of interconnected cells. REYNOLDS proceeds on the basis of an explosive mixture that must be brought to detonation with an electrical spark (see column 2, line 46). Consequently, the object of the invention (see column 1, lines 44 to 49) is to provide a new combustion system that combines the advantages of a combustible metal with the advantages of liquid oxygen into an explosive agent, propellant or an explosive composition.

REYNOLDS solves this problem with a rigid metallic sponge, not a foam, dipped into liquid oxygen mixed in finely divided carbon, dispersed in the liquid oxygen, to saturate the cells up to a quantity of approximately 20 to 30 percent by weight

of the weight of the sponge. This explosive mixture is used as an explosive agent, combustible matter or explosive composition.

Applicants' claimed invention differs in that the combustible material and the oxidation agent are present in a solid phase that is stable at below normal temperatures, and not as with REYNOLDS which includes both solid and liquid phases: solid (metallic sponge and carbon) and liquid (oxidation agent). The combustible material/oxidation agent system in Applicants' invention is a monopropellant, i.e., it does not require continuous spark and deflagrates in a controlled fashion). Also, it does not lead to a detonation. With REYNOLDS, the system is explosive, i.e. there is an uncontrolled combustion that, in the case of rocket propulsion, would lead to the destruction of the rocket and therefore must be avoided at any cost. Explosive agents such as those disclosed in REYNOLDS and monopropellant rocket fuels according to the invention are therefore not randomly interchangeable to a person skilled in the art.

In addition to this difference, there is another difference in that the material forming the sponge in REYNOLDS is different than the open-pored synthetic foam in accordance with the invention. Metallic sponges, such as described in REYNOLDS, and synthetic foams are different types of materials and therefore also have different physical and chemical properties as well as different material characteristic values, which appear in

particular in the low temperature range under load, as are inevitably encountered in rocket propulsions, and do not render it obvious to exchange one type of material for the other.

The properties of the liquid oxidation agent in REYNOLDS, which is dispersed and mixed with carbon, and the solid oxidation agent in the invention are also basically different. It is a generally known fact that all oxidation agents that are liquid below room temperature increase in density and decrease in volume when they solidify (see RÖMP, Chemical Dictionary, page 4000, Volume 5; page 5011, Volume 6; page 5005, Volume 6. Georg Thieme Publishing, Stuttgart [Germany], New York, 1992). Thus, a person skilled in the art must expect significant problems as a result of the decrease in volume if he wants to apply solid/liquid systems in the low temperature range. He must expect that the systems will lose their homogeneity and that the deflagration properties will deteriorate. Because of these facts, a person skilled in the art will not readily replace the solid/liquid system of REYNOLDS with a cryogenic solid/solid system according to the presently claimed invention.

Finally, the problem to be solved by the presently claimed invention is also a different one from that in REYNOLDS, i.e., it is to increase the performance of the cryogenic solid fuels compared to the conventional solid propellants, hybrid propellants or liquid propellant systems, and to improve the

storage life and economic efficiency while avoiding a costly liquid management with simultaneous omission of the permanent spark in a simple manner.

REYNOLDS does not offer a person skilled in the art any clues to exchange the metallic sponge for an open-pored synthetic foam, and to exchange the liquid oxidation agent for a solid oxidation agent, with the open-pored foam also being present in a cryogenic solid condition.

The cited propellant body in accordance with GROSSE describes the preparation of a propellant by freezing, grinding, pressing or casting the elements (see column 5, lines 57 to 63). The propellant body is comprised of a liquid component and an oxidation agent, which does not combust even under atmospheric conditions. It is therefore a composite grain of a great number of frozen combustion bodies and frozen oxidation bodies that form a modular propellant body (see column 5, line 5) in the form of a body designed to burn from the inside (see Fig. 1 and 2) or in form of an end burner (column 5, line 45, Fig. 3 to 4) designed to burn from the surface.

The combustion elements are chemically isolated from one another at the boundary surfaces by suitable cover elements (see column 6, lines 17 to 28). The combustion of modular, non-monopropellant propellant elements is principally a diffuse boundary layer combustion and as such dependent on the inflow of

reactants. If inflow does not occur via a vigorous flow, but rather only through convection, the reaction, if it occurs at all, is irregular and dragging. With propellant bodies that burn from the inside as those proposed by GROSSE et al, this is always the case for the upper (nozzle-rejecting) element and in the case of the GROSSE et al propellants that burn from the outside, having a certain minimum cross-sectional surface of the elements. Therefore, it follows for a person skilled in the art that the cryogenic modular propellant bodies of single particles according to GROSSE et al cannot combust without a continuous spark.

This is also the reason why the prior art, including GROSSE et al, which has been known since June 16, 1964, was not utilized. A person skilled in the art therefore would not consider and take into account in the solution of his problem an inoperative solution such as the solution by GROSSE et al. However, even if a person skilled in the art would consider GROSSE et al, nevertheless, there are very significant differences between the GROSSE et al invention and the presently claimed invention. According to GROSSE et al the combustible material and the oxidation agent are present as cryogenic particles in regular arrangement in the form of disks or layers arranged in a stacked fashion, which are generated by pressing, grinding or casting. In the presently claimed invention, the combustible material is present in the form of an open-pored foam structure of synthetic

material; the liquid oxidation agent is stored in the pores of said foam structure and the entire structure is then frozen. The pressing, grinding or casting required in GROSSE et al is completely obsolete. This is because the liquid oxidation agent is introduced into the pore structure and transferred into a cryogenic phase that is stable below normal temperature by freezing. This creates an irregular oxidation agent structure stored in the open-pored foam structure according to the structure of the pores. The combustible material and oxidation agent are not separated by protective layers, as is the case in GROSSE et al.

Thus, one cannot simply draw from GROSSE et al, the cryogenic technique and apply it to REYNOLDS to arrive at the presently claimed invention, but rather, one must completely abandon the GROSSE et al approach to a solution, i.e., a person skilled in the art must replace the regular particle arrangement of combustible and oxidation agent grains as taught by GROSSE et al with the irregular arrangement of the oxidation agent in the pores of the combustible material according to the presently claimed invention.

GROSSE et al and REYNOLDS do not offer any clues that would suggest that a person skilled in the art must choose the Applicants' approach to arrive at the presently claimed invention, in particular, because a person skilled in the art must overcome a number of technical difficulties to arrive at the invention if he

wants to apply the cryogenic temperatures to synthetic sponges.

These technical difficulties include the following:

frozen synthetic materials are brittle and have mechanical properties that make them appear unsuitable for the requirements in rocket propulsion systems such as stability against acceleration forces, resistance and vibrations,

there is a decrease in the volume of the liquid oxidation agents in their transfer into the frozen phase which may result in the loss of homogeneity and the combustion properties, which cannot be neglected, and

thermodynamic phase conversions in the freezing of liquid oxidation agents may cause unexpected changes in the properties of the oxidation agent.

The combustion of the cryogenic particles of GROSSE et al requires a continuous spark; in the invention, the propellant charge is simply ignited with an igniter, that is sparked only once (see page 10, line 1 to 4 of the description) and the combustion occurs as a boundary layer combustion.

A person skilled in the art will not find any clue whatsoever in GROSSE et al to provide the combustible material or the oxidation agent as a structure for the other partner (oxidation agent and/or combustible matter), that is the oxidation agent is frozen within the irregular pores of the open pore plastic foam

fuel according to the present invention.

STICKLER describes a heterogeneous combustible material that comprises at least one combustible component defined as an essentially oxidation agent-free continuous solid polymeric matrix in which at least individual components of a certain size are dispersed.

This combustible component is not an open-pored foam structure with interconnected cells, but a compact solid, as is shown in particular in the following language in col. 3, lines 46 to 59 of STICKLER.

The combustible material composition comprises a mixture of a continuous combustible material phase that forms a solid matrix in which a dispersed combustible material phase is distributed. Applicants emphasize that "matrix" always means a rigid cladding material that completely encloses a different type of material. The presently claimed invention does not include a matrix in which any other material is distributed there through as a dispersion. With STICKLER, the matrix is supposed to be free of oxidation agent. In the presently claimed invention, on the other hand, the foam structure must be filled with the oxidation agent. In STICKLER, the oxidation agent and the combustible matter combust separately, whereas in the invention, they combust together

The Examiner refers to column 4, lines 50 to 58 of STICKLER which indicates that the combustible materials disclosed in the reference are substantially the same as the combustible materials disclosed in the presently claimed invention. The STICKLER continuous phase 30 is preferably comprised of a combustible polymeric material of polymethylmethacrylate, polybutylmethacrylate, polystyrol, polybutadiene, HTPB, polyethylene, polypropylene, polyurethane, etc.

All of these combustible materials disclosed in STICKLER are present in compositions of solids and, as Fig. 3 shows, do not have an open-pored structure. Rather, it is pointed out to a person skilled in the art in column 7, lines 61 to 64 that the incorporation of bubbles (i.e., closed pores) in the synthetic material leads to a reduction of the combustible matter density and combustion speed. This statement not only establishes that STICKER does not disclose an open-pored sponge structure, but furthermore STICKLER teaches away from the presently claimed invention with its open pore plastic foam fuel having irregular pores, in which an oxidation agent is frozen in situ. See also claim 1, line 3 of STICKLER which states that the heterogeneous solid fuel material matrix is substantially free of oxidizer.

STICKLER discloses a solid/liquid system that uses a matrix of synthetic material as the combustible material, with additives dispersed therein and liquid oxygen as the oxidation

agent. The fuel matrix in STICKLER is free of oxidation agent. As STICKLER shows in Fig. 2 in conjunction with column 1, lines 61 to col. 2, line 7, liquid oxygen is used as oxidation agent, which is combusted in the oxidation agent source 20 completely separately of the combustible material (see column 1, lines 61 to 63 disclosing the injection of the oxidation agent into the combustion chamber containing the combustible material).

Quite apart from STICKLER, according to the presently claimed invention, the combustible material and the oxidation agent form a complete system, which is present as a cryogenic solid/solid system. See claim 17, step (c), and claim 31, lines 8 to 14 of the present invention. STICKLER, on the other hand, leads a person skilled in the art away from a combination of REYNOLDS and GROSSE et al because, once again, STICKLER specifically points out to a person skilled in the art in column 7, lines 61 to 64 that bubble (porous) synthetic material as combustible matter has disadvantageous effects with respect to the combustible properties; yet Applicants obtain their stabilized cryogenic solid monergole propellants by forming open pores in the plastic foam fuel and filling those pores with the oxidation agent, which STICKLER indicates one should avoid.

Furthermore, STICKLER offers a person skilled in the art no suggestion whatsoever to use cryogenic temperatures in preparing rocket propellants. The Examiner is of the opinion that a person

skilled in the art would arrive at the presently claimed invention by combining REYNOLDS, GROSSE et al and STICKLER in, and that this combination is obvious. Aside from the fact that the Examiner has applied a total of five prior art references, from five widely divergent fields, to support his argument that the presently claimed invention is obvious, in fact an analysis of these five references would indicate that the presently claimed invention would not have been obvious to those "skilled in the art." The Examiner's approach to analyze the prior art references does not take into account that the problems defined in REYNOLDS, GROSSE et al and STICKLER are different from those relative to the presently claimed invention, and that REYNOLDS, GROSSE et al and STICKLER include different objects, i.e., with REYNOLDS and STICKLER obtaining a solid/liquid system and with GROSSE et al obtaining a solid/solid system in regular modular particle arrangement. None of the citations, taken individually, or in combination offer a person skilled in the art any clues to provide the presently claimed open pore plastic foam structure as the combustible matter, with an oxidation agent frozen in situ within the pores.

On the one hand, STICKLER includes no examples for synthetic materials such as PUR, polyethylene, GAP and HTBP foam in the low temperature range in the use under the extreme loads of a rocket engine, and on the other hand, even the combustion properties of a synthetic structure with a frozen oxidation agent stored therein are not readily predictable, in particular because

STICKLER clearly points out that bubbles (pores) in the synthetic material lead to a deterioration of the combustion properties and clearly states in the claims that the heterogeneous solid fuel material is a matrix substantially free of oxidizer.

A person skilled in the art cannot take individual characteristics from each of several prior art references, cited in combination, without taking into account their means-effect correlation and without making significant changes to the present solutions that represent the state of the art. For example, one would have to apply the cryogenic engineering from GROSSE et al to the "open-pored synthetic foams" combustible materials without having any knowledge of the behavior of the synthetic foams and oxidation agents in the cryogenic temperature range and under the conditions of use with a rocket engine. Rather, what a person skilled in the art must expect from the present requirements such as elasticity against vibration or jolts by acceleration forces, and the teaching away by STICKLER (column 7, lines 61 to 64) would be that the synthetic materials are not suitable as combustible matter in the low temperature range.

Furthermore, the combination of REYNOLDS, GROSSE et al and STICKLER, which proceeds from a retrospective look with knowledge of the invention, does not take into account that the solutions by REYNOLDS and GROSSE et al date back to 1964 to 1965. If such a combination were obvious, as the Examiner would like to

believe, then said combination would have to have become apparent during that extremely long period in a technical area as busy as that of rocket technology. This, however, has not happened.

Thus the overall difference between the presently claimed invention with respect to STICKLER is that the main combustible material (continuous phase) in STICKLER is completely free of oxidation agent and has additives that are also combustible materials (dispersed phase). Thus, any comparison of the STICKLER combustible material to the sponge by REYNOLDS is already false and not technically tenable for that reason. STICKLER discloses an incorporation of an ancillary combustible material in the main combustible material and not, as is the case of REYNOLDS, an oxidation agent in a metal sponge. The matrix in STICKLER is a continuum, i.e., it forms a connected, compact, solid body in which the additives are distributed throughout as a dispersion. The STICKLER combustible material does not have the structure of a metallic sponge.

Again, bubbles in the matrix are a disadvantage for the combustion properties of the combustible material, as STICKLER discloses in column 7, lines 61 to 64. If bubbles are generated, they are generated in STICKLER (see column 8, 5 to 31) by encapsulation of liquids or by the storage of unmixable liquids (see column 8, 5 to 14). Liquid additives are furthermore hardened (see column 8, line 22) so that the entire body of the combustible

material (matrix) is a continuum.

In any case, the STICKLER combustible material is a body that largely has no pores. This, however, is something completely different when compared to the combustible materials disclosed in either REYNOLDS or in the presently claimed invention.

In STICKLER, column 4, lines 50 to 60, a number of synthetic materials are listed which are used as a combustible material continuum. Polymethylmethacrylates and polybutylmethacrylates are glass-like thermoplastic synthetic materials (such as acrylic glass, for example). Polybutadiene is synthetic natural rubber. However, both synthetic materials are also not found as foam. Applicants do not claim polystyrol in claims 23 and 37. Here, HTBP, polyethylene, polypropylene and polyurethane are not present as a foam structure, but rather as a firm matrix of a self-contained body.

The Examiner's argument, i.e., that a synthetic foam may be an advantage relative to the metallic sponge in REYNOLDS because of more entropy, negates the fact that the metallic sponge and synthetic foams represent different materials, that in particular the synthetics are much more brittle in the low temperature range, and that their suitability as combustible material for a rocket engine follows from their elasticity relative to vibration and jolt sensitivity in acceleration thrust. It is absolutely clear to every person skilled in the art that synthetics are brittle in the low

temperature range and that, unlike the Examiner's view, it is not only the economic advantage that must be taken into account. Furthermore, STICKLER itself points out the problems with the porous combustible matter (again see STICKLER, column 7, line 61 to 67. The combustible material matrix in STICKLER is not sponge-like. It is a continuum, i.e. a continuous compact phase without interconnected pores. Fig. 3 in STICKLER represents the matrix 30, which encloses the additives 32. There are no pores there, and not even any open pores. The matrix 30 encloses the additives completely. Applicants would again like to refer to column 7, lines 61 to 64 in STICKLER.

Furthermore, it must be emphasized again that the combustible matter (matrix) in STICKLER does not have an oxidation agent. In STICKLER, the oxidation agent is spatially separated when it combusts (see Fig. 2) and the combustion gases spark the combustible material.

The STICKLER solid/solid system is not present as a cryogenic system. No cryogenic oxidation agent is introduced into an open pore structure of the combustible material, and it is also not frozen into the whole. The process steps a) and b) in the current claim 17 are new, and they are not obvious relative to the combination of REYNOLDS, GROSSE et al and STICKLER. These process steps in Claim 17 are neither found nor suggested in any of the three cited references, taken individually or in combination, and

furthermore it would not even be obvious to one skilled in the art, having all three references before him,

1. REYNOLDS discloses a solid/liquid system prepared at a normal temperature range, not at a cryogenic temperature.
2. GROSSE et al discloses a frozen, self-sparking solid/solid system in an evenly modular arrangement of combustible material and oxidation agent, which are separated by separating layers, with combustible material and oxidation agent being made by pressing, grinding and casting.
3. STICKLER discloses a solid/liquid system prepared at a normal temperature range without a sponge-like structure, where the oxidation agent and combustible material are combusted in separate locations, with a specific disclosure indicating that pores/bubbles in the combustible material leading to a deterioration of the combustion properties of the combustible material.

STICKLER discloses a hybrid propellant having a solid/liquid system. A system is always monopropellant if the propellant charge functions as an oxidation agent as well as a combustible material. This question does not come up in STICKLER because the oxidation agent is spatially separated from the combustible material and is combusted (see Fig. 2 in STICKLER). Only the combustion waste gases lead to the combustion of the

combustible material in STICKLER, i.e. a continuous feed of the combustion waste gases is required.

The arrangement of combustible material disks and oxidation agent disks as self-sparking in GROSSE et al follows from GROSSE et al as such. Column 6, lines 12 to 36 tell a person skilled in the art that the individual fuel and oxidizer elements are present as alternating agents and may in addition be separated from one another by protective layers. The function of these protective layers is to prevent a quick and spontaneous reaction between the adjacent elements (see column 6, lines 23 and 24).

With respect to the arguments regarding the claims 18 and 32 and/or KRIVOHAVEK and KEILBACH, in combination with the three primary references, Applicants maintain the same arguments as set forth in their amendment of 15 April 2008. KEILBACH et al, however, relates to a self-igniting multi-component fuel (see column 4, line 23), while LO et al relates to a non-self-igniting single-component fuel (monergole).

The referenced coating in KEILBACH et al functions to protect the highly reactive fuel, for example, beryllium, from self-igniting. In LO et al, no such protection is required since monergols are not self-igniting. The encapsulation of the liquid phase in LO et al. functions to disperse the liquid phase within the solid phase, i.e., to prevent an agglomeration of the liquid phase from occurring when it is dispersed within the solid phase.

The functions of the protective layer in KEILBACH et al and LO et al therefore differ and are not comparable.

The combination of REYNOLDS, GROSSE et al, and KEILBACH et al therefore cannot result in the solution of LO et al because

1. REYNOLDS relates to explosive materials and not to monergols;
2. GROSSE et al relates to self-igniting hypergols and not to monergols;
3. KEILBACH et al relates to multi-component systems and not to single-component materials (monergols);
4. REYNOLDS discloses aluminum sponges and not plastic sponges;
5. in REYNOLDS, the fuel is present in the form of an aluminum sponge, while in LO et al it is not metal sponge that is employed but instead a plastic sponge;
6. The encapsulation in KEILBACH et al functions as protection against reaction, the encapsulation in LO et al functions, conversely, to ensure dispersion in the fuel or in the oxidizer.

Applicants maintain that a person skilled in the art would not use a multi-phase emulsion according to KRIVOHlavek in rocket engines (feeding the liquid multi-phase emulsion into the

combustion chamber by pumps would lead to its degradation).

KRIVOHLAVEK is otherwise not relevant to the solution of the problem of the invention according to LO et al, in other words, the reference is nonanalogous art.

The person skilled in the art will not take KRIVOHLAVEK into consideration because:

1. the multi-phase emulsion contains water;
2. the use of such an emulsion in rocket propulsion would result in demixing when fed into the combustion chamber;
and
3. low-temperature use is not disclosed.

Applicants believe that all claims now presented are in condition for allowance and a response to that effect is earnestly solicited. Applicants are enclosing a petition to obtain a three month extension of the term for responding to the office action mailed 24 June 2008. Applicants are also enclosing a notice of appeal

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Enclosures: Request for extension (three months, small entity)

Notice of Appeal